Improving the Quality of Nasal Specimen Collection for Influenza A and B Screening

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Contribution to Emergency Nursing Practice:

- Compared with nasopharyngeal aspirate or nasopharyngeal swab techniques, nasal swab is more comfortable for patients and may be easier for the emergency nurse to use.
- Instillation of sterile saline into the nares, or "Wet Swab," is used in an attempt to improve specimen collection and preservation of viral material.
- The Wet Swab method may be clinically superior for detecting influenza in adults presenting later in the course of illness. Inserting the swab in gel medium may also increase moisture.
- Emergency nurses should be engaged in decision-making for supplies and changes in supplies, and manufacturers' instructions for supplies they use in clinical practice.
- Definitive diagnosis of Influenza, even beyond the 48-hour antiviral treatment window, may inform patient teaching and interventions to prevent spread to close contacts.

Problem: Rapid diagnosis of seasonal influenza leads to optimized clinical care and reduces the spread of infection. The collection of adequate cellular material can be facilitated by the presence of moisture in the nares. The specific aim of this project was to determine if the installation of sterile saline into the nares prior to specimen collection would improve the quality of the specimen.

Methods: This quasi-experimental single group design tested an initial "dry swab" specimen against a second swab after instillation of sterile saline solution using a nasal atomizer, a "wet swab."

Results: A total of 80 paired specimens were collected and analyzed between December 7, 2015, and April 21, 2016, with an 11.25% infection rate in those tested. Of 9 positive tests, 6 subjects tested positive for influenza A or B for both the dry swab and the wet swab. Three subjects tested positive for influenza A or B for only the wet swab, and these subjects had experienced their symptoms longer than did subjects who tested positive for both methods (mean symptom onset of 72 hours vs 66 hours). We found an important inconsistency between manufacturers' recommendations and typical hospital practice.

Implications for Practice: The results appear somewhat equivocal. Because viral shedding declines after the first 48 to 72 hours in adults, the wet swab method may be clinically superior for detecting influenza in adults presenting later in the course of their illness. Hospital policy was revised for consistency in using the gel medium before sampling in accordance with manufacturer recommendations.

Key words: Influenza; Specimen collection; Nasal swab; Practice improvement; Patient comfort; Viral shedding

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Rapid diagnosis of seasonal influenza can lead to optimized clinical care and reduce the spread of infection.[1] The collection of adequate cellular material, facilitated by the presence of moisture in the nares, is important for the detection of viruses.[2]

The World Health Organization (WHO) estimates that the annual rate of influenza falls between 5% to 10% for adults and 20% to 30% for children.[3] These annual epidemics result in 3 to 5 million cases of serious illness and between 250,000 to 500,000 deaths annually.[3] The National Vital Statistics Report for 2013, published by the Centers for Disease Control and Prevention (CDC), listed influenza as the primary cause of death for 3697

individuals, a rate of 1.2 deaths per 100,000.[4] This figure, however, may underestimate the actual number of cases, because influenza is rarely listed as a cause of death for persons who die from flu-related complications.[5] The magnitude of the problem in New Hampshire, the site of this current quality improvement project, can be measured in terms of influenza-associated deaths and student absenteeism. During the 2014-2015 influenza season, electronic surveillance of death certificates identified 49 influenza-associated deaths.[6] The state surveillance program identified between 0.1% and 0.4% of student absenteeism to be attributed to influenza-like illness.[7]

Persons with upper respiratory symptoms such as fever, cough, a runny or stuffy nose, a sore throat, headache, and general muscle or body aches who seek care in an emergency department or a primary care setting are often screened with a rapid chromatographic immunoassay test to determine if they have contracted a strain of the influenza virus because these tests offer rapid results, generally within 15 to 20 minutes.[8]

In the setting of this quality improvement project, nasal swabs come in a bulk package from the manufacturer, and package inserts and instructions may be separated from the nurse end-user. In addition, new products may be introduced without nursing input or communication to the nurses who collect the samples at the bedside. Thus nurses may not be aware of nasal swab supply changes until the moment the nasal swab is needed in practice.

Available Knowledge

Influenza specimen collection techniques have been tested in children and adults with acute respiratory illnesses, as well as in immunocompromised adults. Studies have compared nasopharyngeal aspirates (NPAs) to nasal swabs, nasopharyngeal swabs (NPSs) to nasal swabs and nasal swabs to NPAs, nasal washes, and nasal brushing for the detection of influenza, adenovirus, parainfluenza virus, respiratory syncytial virus, and other upper respiratory viruses. NPAs generally performed with greater sensitivity than did NPSs or nasal swabs.[9-12] However, one study found nasal flocked swabs to be equally sensitive to NPAs for all viruses tested except respiratory syncytial virus.[1] The comparison between NPSs and nasal swabs is less definitive. One study indicated that NPSs may be more sensitive than nasal swabs, but the results were not statistically significant.[13] Results of a study by Spyridaki et al[12] found no significant differences in the detection rates between various methods (nasal aspirate, nasal swab, nasal wash, and nasal brush) for influenza.

The NPA and NPS techniques collect the nasal specimen from the posterior nasopharynx, where higher moisture content is generally found compared with the anterior nasal passages. What was unclear from the reviewed literature was if instilling moisture in the anterior nares would improve specimen collection. Thus the purpose of this project was to compare a wet swab and dry swab collection method in the anterior nares to determine if increasing the moisture level would improve detection of the influenza virus.

Rationale and Specific Aim

Screening for influenza in an emergency department or primary care setting is often performed with a rapid chromatographic immunoassay test.[8] Additionally, rapid chromatographic immunoassay tests are recommended by both the CDC and the WHO.[14,15] Moisture is a key component for the preservation of viral material because it facilitates the collection of adequate cellular material, preserving that material until it can be examined in the laboratory.[16] As previously noted, a nasal specimen can be collected via a nasal swab, an NPS, or NPA. NPA is collected by inserting a catheter into the nostril to a depth of 5 to 7 cm and then drawing back while applying gentle suction. NPSs are obtained via the insertion of a cotton swab, attached to a flexible wire, into the nares, past the nasal turbinates, and into the posterior nasal pharynx. The collection of both these specimens, as noted in anecdotal reports by the symptomatic patient, is unpleasant. The collection technique for these types of specimens also requires more time and collector training than does a nasal swab. The nasal swab is only inserted into the nares until it encounters the nasal turbinates, approximately 2 cm, and is then swirled a few times and removed. Although this procedure for specimen collection is more comfortable for the patient, it tends to yield lower sensitivity than an NPS or NPA.[9-13]

Patients who have an upper respiratory infection often present to the health care setting with fever, which can lead to mild dehydration and dry mucous membranes.[17] The lack of moisture in the nares may contribute to the increased occurrence of false negative results using the nasal swab. Moisture is a key component for the preservation of viral material by facilitating the collection of adequate cellular material and preserving that material until it can be examined in the laboratory.[16] The specific aims of this quality improvement project were to[1] examine whether the installation of 1 to 1.5 mL of sterile saline solution into each nares prior to specimen collection would improve the quality of the specimen sample, and[2] review the within–